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## **CHAPTER 1 STATE ENERGY OBJECTIVES AND THE HAWAII ENERGY STRATEGY**

### **1.1 State of Hawaii Energy Program**

#### **1.1.1 *The State Energy Resources Coordinator***

Chapter 196, Hawaii Revised Statutes (HRS), assigns the Director of the Department of Business, Economic Development & Tourism (DBEDT) the duties of State Energy Resources Coordinator (ERC). The Director serves as cabinet-level energy coordinator and advisor to the Governor and all levels of government, and industry. The Director is responsible for State energy planning and policy development. The Hawaii Energy Strategy program is the basic element of the planning and development process.

#### **1.1.2 *State Energy Policy Objectives***

The Hawaii Energy Strategy program was designed to increase understanding of Hawaii's energy situation and produce recommendations to achieve the statutory energy objectives outlined in Section 226-18, Hawaii Revised Statutes (HRS), Objectives and policies for facility systems – energy, as amended by Act 96, Session Laws of Hawaii 1994, of:

- a) Planning for the State's facility systems with regard to energy shall be directed towards the achievement of the following objectives:
  - (1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;
  - (2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased; [and]
  - (3) Greater energy security in the face of threats to Hawaii's energy supplies and systems.
- (b) To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.
- (c) To further achieve the energy objectives, it shall be the policy of this State to:
  - (1) Support research and development as well as promote the use of renewable energy sources;
  - (2) Ensure that the combination of energy supplies and energy-saving systems are sufficient to support the demands of growth;
  - (3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least cost is determined by a

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reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;

- (4) Promote all cost-effective conservation of power and fuel supplies through measures including:
  - (A) Development of cost-effective demand-side management programs;
  - (B) Education; and
  - (C) Adoption of energy-efficient practices and technologies;
- (5) Ensure to the extent that new supply-side resources are needed, the development or expansion of energy systems utilizes the least-cost energy supply option, and maximizes efficient technologies;
- (6) Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies; and
- (7) Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure.

### **1.1.3 Hawaii Energy Strategy Background**

The Hawaii Energy Strategy (HES) program was initiated March 2, 1992 under a Cooperative Agreement with the United States Department of Energy (USDOE). The first HES was completed in October 1995. Throughout this document, the original HES will be referred to as *HES 1995*. It consisted of the following seven projects:

- Project 1: Develop an Analytical Energy Forecasting Model for the State of Hawaii;
- Project 2: Fossil Energy Review and Analysis;
- Project 3: Renewable Energy Resource Assessment Development Program;
- Project 4: Demand-Side Management Assessment;
- Project 5: Transportation Energy Strategy;
- Project 6: Energy Vulnerability Assessment Report and Contingency Planning; and
- Project 7: Energy Strategy Integration and Evaluation System.

The projects each involved significant consultant support and produced detailed, comprehensive documents in each subject area as well as the first iteration of the ENERGY 2020 software, which provided a model of the energy system and

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economy of each of Hawaii's four counties. The recommendations of *HES 1995* and their results are reviewed in Appendix D of this report.

## **1.2 Hawaii Energy Strategy 2000, Purpose and Objectives**

The purpose of *HES 2000* is to assist State of Hawaii planners and policy makers, members of the Hawaii energy community, and Hawaii's people to better understand Hawaii's current energy situation. It develops and analyzes possible future energy scenarios and suggests a preferred energy future for Hawaii.

*HES 2000* is intended to support achievement of the State Energy Objectives and has the following specific objectives:

- Increase diversification of fuels and the sources of supply of these fuels;
- Increase energy efficiency and conservation;
- Develop and implement regulated and non-regulated energy development strategies with the least possible overall cost to Hawaii's society;
- Enhance a system of comprehensive energy policy analysis, planning, and evaluation;
- Increase the use of indigenous renewable energy resources; and
- Enhance contingency planning capabilities to effectively contend with energy supply disruptions.

It should be noted that "cost" as defined above in (c)(3) of the State energy policies is derived through a reasonably comprehensive quantitative and qualitative accounting of an option's long-term direct and indirect economic, environmental, social, cultural, and public health costs and benefits. Out of a growing concern about a vital environmental issue, the potential effects on Hawaii of global climate change due to greenhouse gas emissions (see Section 1.3.5), *HES 2000* supplements the work of the Hawaii Climate Change Action Program. This involves a new focus on measures that seek to more efficiently use energy or provide indigenous energy alternatives and thereby reduce greenhouse gas emissions. Accordingly, the following objective was added to those cited above for *HES 2000*:

- Reduce greenhouse gas emissions from energy supply and use.

*HES 2000* incorporates the Hawaii Climate Change Action Program, which is discussed below in greater detail.

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## **1.3 Hawaii Climate Change Action Program**

### **1.3.1 *Hawaii and Climate Change***

The State of Hawaii initiated its Hawaii Climate Change Action Program in 1996, in recognition of the fact that Hawaii faces many potential negative consequences from global warming and climate change. Higher temperatures could make Hawaii less of a paradise. Greater heat may cause more heat-related mortality. Concentrations of ground-level ozone could increase, causing respiratory illnesses. Warmer seas could enhance growth of toxic algae and bacterial contamination of coastal waters. Warmer weather could expand the habitat of disease-carrying insects to Hawaii (USEPA 1998a).

Sea level rise is occurring and could lead to coastal flooding, erosion of beaches, and saltwater contamination of drinking water. Hawaii can expect other negative effects on its water resources, as well as on its agriculture, forests, and other ecosystems. During storms, additional areas will become vulnerable to waves and storm surge (USEPA 1998a).

### **1.3.2 *Hawaii and Reduction of Greenhouse Gas Emissions***

The Intergovernmental Panel on Climate Change (IPCC) is a panel of international climate scientists jointly established in 1988 by the World Meteorological Organization and the United Nations Environment Program to (a) assess available information on climate change, (b) assess the environmental and socio-economic impacts of climate change, and (c) formulate response strategies. The IPCC First Assessment Report, completed in 1990, served as the basis for the negotiation of the United Nations Framework Convention on Climate Change. The IPCC's Second Assessment Report, completed in 1995, stated that "the balance of evidence suggests a discernible human influence on global climate" (IPCC 1996). The IPCC Second Assessment Report also noted the increased concentration of greenhouse gases, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) since pre-industrial times, largely due to human activity. These increased concentrations have warmed the earth's surface, which tends to produce other changes in climate. Climate change effects have already been observed and will occur in the future.

It will be necessary to stabilize concentrations of greenhouse gases to prevent even more dramatic changes in climate than are expected over the next century due to greenhouse gases already in the atmosphere. Although Hawaii's greenhouse gas emissions are only 0.3% of total U.S. greenhouse gas emissions, no matter how small they are, Hawaii's greenhouse gas emissions contribute to climate change, and they can and should be reduced. All states and all nations will ultimately need to contribute to efforts to mitigate future climate change.

### **1.3.3 *Hawaii's Participation in the State and Local Climate Change Program***

Hawaii has become a Climate Change Partner in the U.S. Environmental Protection Agency (USEPA) State and Local Climate Change Program. The

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USEPA has involved individual States in its program out of recognition that “although problems such as global warming need to be addressed through cooperative national and international efforts, many of the critical responses can be initiated locally. If the adverse effects of climate change are to be avoided, states will need to take an active and immediate role in addressing greenhouse gas emissions” (USEPA 1998b, 2-11).

The reasons the USEPA cites for seeking State involvement in the Climate Change Program included the following:

- States retain much of the policy jurisdiction over emissions sources;
- The United States Climate Change Action Plan (CCAP) creates new opportunities for states for support to state action;
- States have the capacity for enacting “low risk” policies to address climate change;
- States will feel the impacts of climate change and will likely be called upon to address them (2-12).

#### **1.3.4 *Inventory of Hawaii Greenhouse Gas Emissions, Estimates for 1990***

Under a grant from the USEPA, the *Inventory of Hawaii Greenhouse Gas Emissions, Estimates for 1990* was completed in 1997 (DBEDT 1997a). The *Inventory* was Phase I of the Program for Developing, Implementing, and Evaluating a Greenhouse Reduction Strategy for the State of Hawaii, which is being jointly conducted by the DBEDT’s Energy, Resources, and Technology Division; and the Department of Health’s (DOH) Clean Air Branch. This work was performed with the support of a grant from the USEPA and had following purposes:

- Identifying their greenhouse gas emissions sources and estimating their overall contribution to radiative forcing;
- Assessing the areas of the state that are most vulnerable to climate change; and
- Developing state-specific greenhouse gas mitigation strategies (USEPA 1995, v).

The inventory is a basis for future efforts to reduce Hawaii’s contribution to global warming.

#### **1.3.5 *Hawaii’s Climate Change Action Plan***

A Hawaii Climate Change Action Plan Workshop on October 30, 1997, was an initial effort to obtain citizen input on Hawaii’s goals and suggestions for emission reduction measures. About 100 citizens heard a report on the State’s efforts in the area of climate change action and provided their views on ways to reduce future greenhouse gas emissions. These were included in the Plan.

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As Phase II of the Program, the first iteration of a *Hawaii Climate Change Action Plan* (DBEDT 1998b) was completed in November 1998. The plan did not set specific goals but was intended as a catalyst for discussion by Hawaii's people about their involvement in future efforts to reduce emissions and to adapt to climate change. The major recommendation of the first plan was to develop consensus as to Hawaii's goals for reducing greenhouse gas emissions.

### **1.3.6 Recommendations Related to Climate Change**

#### **1.3.6.1 RECOMMENDATION: Propose a New State Energy Objective Related to Climate Change**

**Suggested Lead Organizations: DBEDT (ERTD and Office of Planning with supporting testimony by interested stakeholders) for consideration by the Legislature**

The phrase "Reduce greenhouse gas emissions from energy supply and use" should be added to the State of Hawaii energy objectives in §226-18a, HRS. This proposed objective is intended to add a planning consideration and not to specify reduction levels or to set other requirements.

#### **1.3.6.2 RECOMMENDATION: Continue Hawaii Climate Change Action Program and Participation in U.S. Environmental Protection Agency's State and Local Climate Change Partners' Program**

**Suggested Lead Organizations: DBEDT, Department of Health, Department of Land and Natural Resources, and other State Agencies, the Counties, and Interested Stakeholders**

Further work is needed to set specific goals for greenhouse gas reductions; for implementing emission reductions; and to identify future effects of climate change on Hawaii's people, environment, ecosystems, and economy in order to identify the changes to which the State must adapt. Continued participation in USEPA State and Local Climate Change Partners' Program will provide valuable information, supporting analyses, and potential funding of Hawaii climate change activities.

#### **1.3.6.3 RECOMMENDATION: Set Hawaii Greenhouse Gas Reduction Goals with Public Input**

**Suggested Lead Organizations: DBEDT, Department of Health, Department of Land and Natural Resources, other State Agencies, Counties, and Interested Stakeholders**

Public input should be solicited to help set any Hawaii-specific greenhouse gas reduction goals. A commission or task force charged with considering public input could lead this effort. Educational efforts to inform the population on the issues should precede the goal-setting process.

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Hawaii's efforts should focus on those emissions that can be managed locally. This would exclude emissions from overseas marine activities, all international aviation activities, and military activities. In the near term, due to the high level of their contribution of emissions, the focus should be on electricity generation, ground transportation, and municipal waste management. Forest development and reforestation offers ways to offset some of Hawaii's emissions.

There are many geographic, climatological, technological, economic, environmental, cultural, and other considerations that must be considered. In particular, Hawaii's high level of energy efficiency leaves fewer options for emissions reduction than elsewhere, but high energy costs in Hawaii can help make many reductions financially rewarding. At the same time, Hawaii offers such resources as abundant sunshine for solar power and trade winds for wind power. These should be more fully developed.

Hawaii's tourism-based economy poses yet another special challenge. For example, the State economy is dependent on transoceanic and interisland air travel; thus a large percentage of Hawaii's emissions are from the use of jet fuel. Significant reductions in air travel would be an economic disaster for the State. To reduce emissions from this source, Hawaii must depend on aircraft manufacturers providing more efficient aircraft and on efficient operations by airlines.

**1.3.6.4      RECOMMENDATION: Identify Future Effects of Climate Change on Hawaii and Plan Adaptation Measures**

**Suggested Lead Organizations: DBEDT (Office of Planning and ERTD), DOH, DLNR, Other State Agencies, Counties, and Interested Stakeholders**

Hawaii's emissions are small and reductions will contribute only a small amount to global efforts. Hawaii will experience various effects from climate change caused by past and current greenhouse gas emissions that occurred or will occur elsewhere. As global reductions in emissions are likely to take many years, the effects forecast for the next century on temperature change, sea level rise, and other concerns *will* happen. Their specific effects on Hawaii should be further explored and modeled. Adaptation measures may also take many years, if not decades, to implement. The measures required must be identified and initiated soon.